

***NATIONAL WEATHER SERVICE INSTRUCTION 10-922
SEPTEMBER 17, 2002***

***Operations and Services
Hydrologic Services Program, NWSPD 10-9***

WEATHER FORECAST OFFICE HYDROLOGIC PRODUCTS SPECIFICATION

NOTICE: This publication is available at: <http://www.nws.noaa.gov/directives/>

OPR: OS31 (R. Pierce)
Type of Issuance: Initial

Certified by: OS3 (G. Austin)

SUMMARY OF REVISIONS: This directive supersedes WSOM Chapter E-22, Issuance 01-09, dated August 6, 2001.

Signed
Gregory A. Mandt
Director, Office of Climate,
Water, and Weather Services

September 17, 2002
Date

Weather Forecast Office Hydrologic Products Specification

<u>Table of Contents</u>	<u>Page</u>
1. Introduction	4
1.1 Purpose	4
1.2 Scope	4
1.3 Objective	4
2. Organizational Responsibilities	4
2.1 Weather Service Headquarters	4
2.2 Regional Headquarters	4
2.3 Weather Forecast Offices	4
3. Hydrologic Products Dissemination	4
3.1 Dissemination Content	4
3.2 Dissemination Requirements	5
4. Hydrologic Warning and Forecast Products	5
4.1 Hydrologic Outlook	5
4.1.1 Product ID	5
4.1.2 World Meteorological Organization Header	5
4.1.3 Mass News dissemination Header	5
4.1.4 Issuance Criteria	5
4.1.5 Content and Format	6
4.1.6 Valid time	6
4.2 Flood Watch	6
4.2.1 Product ID	6
4.2.2 WMO Header	6
4.2.3 MND Header	6
4.2.4 Issuance Criteria	6
4.2.5 Content and Format	7
4.2.6 Valid time	7
4.3 Flash Flood Warning	7
4.3.1 Product ID	7
4.3.2 WMO Header	7
4.3.3 MND Header	7
4.3.4 Issuance Criteria	8
4.3.5 Content and Format	8
4.3.6 Valid time	9
4.4 Flash Flood Statement	9
4.4.1 Product ID	9
4.4.2 WMO Header	9
4.4.3 MND Header	9
4.4.4 Issuance Criteria	9

4.4.5	Content and Format	9
4.4.6	Valid time	10
4.5	Flood Warning	10
4.5.1	Product ID	10
4.5.2	WMO Header	10
4.5.3	MND Header	10
4.5.4	Issuance Criteria	10
4.5.5	Content and Format	10
4.5.6	Valid time	11
4.6	Flood Statement	11
4.6.1	Product ID	11
4.6.2	WMO Header	11
4.6.3	MND Header	11
4.6.4	Issuance Criteria	11
4.6.5	Content and Format	11
4.6.6	Valid time	12
4.7	Hydrologic Statement	12
4.7.1	Product ID	12
4.7.2	WMO Header	12
4.7.3	MND Header	12
4.7.4	Issuance Criteria	12
4.7.5	Content and Format	12
4.7.6	Valid time	12
4.8	Hydrologic Summary	12
4.8.1	Product ID	13
4.8.2	WMO Header	13
4.8.3	MND Header	13
4.8.4	Issuance Criteria	13
4.8.5	Content and Format	13
4.8.6	Valid time	13
4.9	Daily River and Lake Summary	13
4.9.1	Product ID	13
4.9.2	WMO Header	13
4.9.3	MND Header	13
4.9.4	Issuance Criteria	13
4.9.5	Content and Format	14
4.9.6	Valid time	14
5.	Weather Forecast Office Hydrologic Product Examples	14
6.	Advanced Hydrologic Prediction Service	14
7.	Hydrologic Data Products	14

1. Introduction.

1.1 Purpose. This directive describes the content, issuance criteria, format, and dissemination of weather forecast office (WFO) hydrologic forecast, warning, and data products.

1.2 Scope. This directive applies to all NWS personnel.

1.3 Objectives. To produce and deliver hydrometeorological products for our partners and customers.

2. Organizational Responsibilities.

2.1 Weather Service Headquarters. Weather Service Headquarters will manage the national hydrologic forecast and warning program. The Office of Climate, Water, and Weather Services (OCWS) is responsible for developing and maintaining policy, conducting outreach, collecting requirements and leading product improvement to meet customer needs.

2.2 Regional Headquarters. Regional headquarters will review hydrologic products, ensure policy is followed, and conduct outreach. They may issue supplements to this directive.

2.3 Weather Forecast Offices. WFOs will be responsible for issuance of hydrologic products for their hydrologic service area (HSA). WFOs are responsible for the quality of their hydrologic products and services, and customer outreach. WFOs may suggest hydrologic product and service changes to their regional headquarters, but will not make those changes until the recommendation has been approved and customers are notified.

3. Hydrologic Products Dissemination. Hydrologic products are made available to the public over NWS-supported public dissemination pathways and the Internet. Standards for text products distributed over AWIPS and NWS-supported dissemination systems are contained in NWS Instruction 10-1701, "Text Product Formats and Codes."

3.1 Dissemination Content. Hydrologic forecast and warning products will contain the following:

- a. Product Identifier (ID). A distinct 3-letter product specific identifier described in section 4, listed by product in item 1.
- b. World Meteorological Organization Header. A distinct World Meteorological Organization (WMO) header is specified for each product in section 4 by product name in item 2. The six letter code (TTUSii) noted in the document is different for off continental United States (OCONUS) locations. OCONUS locations will use the following in lieu of TTUSii: TTAKii (Alaska); TTPHii (Hawaii); TTCAii (Puerto Rico).
- c. Mass News Dissemination Header. A distinct mass news dissemination (MND) header matching the WMO header and Product ID in section 4, item number 3.

- d. Universal Geographic Code (UGC). A UGC, specific to the geographic area to appropriate hydrologic products.
- e. Valid Time. A valid time specific to the product can be found in section 4 by product name in item number 6.

3.2 Dissemination Requirements. Hydrologic forecast and warning products will adhere to the following dissemination requirements:

- a. Emergency Alert System (EAS). Use of EAS on NWS products is a state and local EAS committee decision. The use of EAS will be documented in the local Station Duty Manual.
- b. Console Replacement System (CRS) and/or EAS Product Requirements. All products will be within the length limitations and meet the format requirements for the CRS and/or EAS. If tabular data, such as river flood stage, stage data or forecast data in a table format are included, these data will be preceded by a blank line, the double ampersand delimiter “&&” on a separate line, and another blank line.
- c. Corrections. Hydrologic forecasts and warning products will be corrected as needed. A brief statement giving the reason for the correction will be included.

4. Hydrologic Products. The following products are designed to meet the needs of national, regional and local partners and customers and are supported by nationally developed software.

4.1 Hydrologic Outlook. Hydrologic outlooks provide information on hydrometeorological conditions which could cause flooding or impact water supply.

4.1.1 Product ID. ESF

4.1.2 WMO Header.
FGUSii CCCC YYGGgg BBB
ESFNNN

4.1.3 MND Header.
HYDROLOGIC OUTLOOK
NATIONAL WEATHER SERVICE (insert WFO name)
Time AM or PM (local) day month date year

4.1.4 Issuance Criteria. This product will be issued if precipitation forecasts or snow melt potential indicate the possibility of flooding beyond 36 hours. This product may also be used to provide additional hydrologic information such as seasonal water supply and dry weather conditions.

4.1.5 Content and Format. The hydrologic outlook product will include:

- a. Headline defining the type of flooding or water supply issue being addressed (e.g., flash flooding, main stem river flooding, snow melt flooding, extended stream flow prediction);
- b. Area covered;
- c. Timing of the event;
- d. Relevant factors (e.g., synoptic conditions, quantitative precipitation forecasts (QPF), or soil conditions);
- e. A closing statement indicating when additional information will be provided.

In cases where an ESF has been issued in relation to a potential flood event and flooding does not materialize, an ESF indicating the end of the flood threat will be issued.

4.1.6 Valid Time. This product will be valid from the time of release or specified time until canceled, updated, or replaced.

4.2 Flood Watch. Flood watches inform the public of hydrometeorological conditions which may cause flooding, but the flooding is neither certain nor imminent. Flood watches may cover states, counties, portions of counties or states.

4.2.1 Product ID. FFA

4.2.2 WMO Header.
WGUSii CCCC YYGGgg BBB
FFANNN

4.2.3 MND Header.
BULLETIN - IMMEDIATE BROADCAST REQUESTED
(See Section 3.2.a)
FLOOD WATCH
NATIONAL WEATHER SERVICE (insert WFO name)
Time AM or PM (local) day month date year

4.2.4 Issuance Criteria. This product will be issued if the following conditions occur during the first 36 hours of the forecast period:

- a. Meteorological, soil, and/or hydrologic conditions indicate flooding is possible but not certain; or
- b. The effective time of a pre-existing watch changes; or

- c. The geographical area covered by a pre-existing flood watch increases; or
- d. A dam or levee may fail threatening lives or property, but the threat is not deemed imminent.

4.2.5 Content and Format. Flood watch products will include the following:

- a. Headline highlighting the flood hazard;
- b. Valid time;
- c. Area covered;
- d. Potential impact of the flooding;
- e. Relevant factors (e.g., synoptic conditions, quantitative precipitation forecasts (QPF), or soil conditions);
- f. Definition, “A flood watch means flooding is possible but not imminent”;
- g. A call-to-action statement; and
- h. A statement indicating possible issuance of a warning should it become necessary.

4.2.6 Valid Time. This product will be valid from the time of release or specified time until canceled, updated or it expires.

4.3 Flash Flood Warning. Flash flood warnings are issued when flooding is imminent. Flash flooding occurs when the water level rises rapidly to inundation within a period of 6 hours of the causative event. This product will be reserved for those short-term events which require immediate action to protect lives and property, such as dangerous small stream flooding or urban flooding, and dam or levee failures. Flash flood warnings may cover counties, portions of counties, or well-known geographical areas (e.g., valleys) or river basins. Flash flood warnings will not be combined with severe thunderstorm (SVR) or tornado (TOR) warnings.

4.3.1 Product ID. FFW

4.3.2 WMO Header.
WGUSii CCCC YYGGgg BBB
FFWNNN

4.3.3 MND Header.
BULLETIN - EAS ACTIVATION REQUESTED
FLASH FLOOD WARNING
NATIONAL WEATHER SERVICE (insert WFO name)
Time AM or PM (local) day month date year

4.3.4 Issuance Criteria. This product will be issued when:

- a. Flash flooding is reported; or
- b. precipitation capable of causing flash flooding is indicated by radar, rain gages, and/or satellite; or
- c. Local flash flood monitoring and prediction tools indicate flash flooding is likely; or
- d. The effective time of a pre-existing warning changes; or
- e. The geographical area covered by a pre-existing flash flood warning increases; or
- f. A dam or levee failure, or the sudden failure of a naturally-caused stream obstruction (including debris slide, avalanche, or ice jam) is imminent or occurring.

4.3.5 Content and Format. Flash flood warnings will include:

- a. The bullet format specified for short-fuse warning products - i.e., short indented paragraphs delimited with an asterisk (*), in the main body of a flash flood warning. This consists of the introductory statement:

“THE NATIONAL WEATHER SERVICE IN [LOCATION] HAS ISSUED A

* FLASH FLOOD WARNING FOR”

trailed by each of the following, delimited with a separate bullet:

- b. Area covered;
- c. Valid time;
- d. Basis for the warning (e.g., radar report or reported dam failure) and known direction of storm movement, and
- e. Forecasted storm path, rainfall amount/intensity, specific locations affected (i.e., streams, streets, roads, neighborhoods, etc.), potential flood impacts, and categorical (see NWS Manual 10-950) stage forecast. (Optional)
- f. A call-to-action statement will be included after the bullets.
- g. Additional information such as flooding history. (Optional)

- h. Tabular data, such as river flood stage, stage data or forecast data in a table format. (Optional) If included, these data will conform with CRS and EAS policy by being preceded by a blank line, the double ampersand delimiter “&&” on a separate line, and another blank line.

4.3.6 Valid Time. This product will be valid from the time of release or specified time until canceled, updated or expired.

4.4 Flash Flood Statement. Flash flood statements contain supplemental information on flash flood warnings (e.g., updated observations and impact information).

4.4.1 Product ID. FFS

4.4.2 WMO Header.
WGUSii CCCC YYGGgg BBB
FFSNNN

4.4.3 MND Header.
FLASH FLOOD STATEMENT
NATIONAL WEATHER SERVICE (insert WFO name)
Time AM or PM (local) day month date year

4.4.4 Issuance Criteria. Are as follows:

- a. Cancellation or expiration of a flash flood warning; or
- b. Additional information is available to supplement a flash flood warning.

4.4.5 Content and Format. Flash Flood statements should include the following:

- a. Headline describing the flash flooding conditions;
- b. Area affected;
- c. Notification of the cancellation or expiration of a flash flood warning;
- d. Call-to-action statement;
- e. Updated impact information;
- f. Additional information including observed and/or forecast data. (Optional) If included, tabular data, such as river flood stage, stage data or forecast data in a table format, will conform with CRS and EAS policy by being preceded by a blank line, the double ampersand delimiter “&&” on a separate line, and another blank line.

4.4.6 Valid Time. This product will be valid from the time of release until the referenced flash flood warning expires.

4.5 Flood Warning. Flood warnings are issued when flooding is expected to occur more than 6 hours after the causative event (e.g., heavy precipitation, snow melt, ice jams, or reservoir releases). Flood warnings are issued for forecast points, areas along rivers and streams, and for counties or portions of counties.

4.5.1 Product ID. FLW

4.5.2 WMO Header.
WGUSii CCCC YYGGgg BBB
FLWNNN

4.5.3 MND Header.
BULLETIN - EAS ACTIVATION REQUESTED (See Section 3.2.a)
or
BULLETIN - IMMEDIATE BROADCAST REQUESTED
FLOOD WARNING
NATIONAL WEATHER SERVICE (insert WFO name)
Time AM or PM (local) day month date year

4.5.4 Issuance Criteria. This product will be issued when:

- a. Flood monitoring and prediction tools and/or RFC guidance indicate flooding is likely; or
- b. Flooding is reported; or
- c. The effective time of a pre-existing warning changes; or
- d. The geographical area covered by a flood warning increases; or
- e. The magnitude of the flood changes category (e.g. minor to moderate, major to moderate, etc.). For categorical definitions, please see NWS Manual 10-950.

4.5.5 Content and Format. Flood warnings will include the following listed in the order below:

- a. Headline indicating, "Flood Warning," the river/stream name, affected areas, and flood category (minor, moderate, major, flood of record - for definitions see NWS Manual 10-950);
- b. Observed level and flood stages for the warned locations (if available);

- c. The times when 1) flood stage is exceeded, 2) crest is expected, and 3) water falls below flood stage (if available);
- d. Statements describing the impact of observed and/or forecast flooding;
- e. Call-to-action statement;
- f. Time of next product issuance;
- g. Observed and forecast data in tabular format. (Optional) If tabular data, such as river flood stage, stage data or forecast data in a table format are included, these data will conform with CRS and EAS policy by being preceded by a blank line, the double ampersand delimiter “&&” on a separate line, and another blank line.

4.5.6 Valid Time. This product will be valid from the time of release or specified time until canceled, updated, or replaced.

4.6 Flood Statement. Flood statements contain supplemental information on flood watches and warnings (e.g., updated observations and impact information). This product may also be used to provide information on elevated stream or river flows, or ponding of water in urban areas, which warrant public notification but not a warning.

4.6.1 Product ID. FLS

4.6.2 WMO Header.
WGUSii CCCC YYGGgg BBB
FLSNNN

4.6.3 MND Header.
FLOOD STATEMENT
NATIONAL WEATHER SERVICE (insert WFO name)
Time AM or PM (local) day month date year

4.6.4 Issuance Criteria. Are as follows:

- a. Cancellation or expiration of a flood watch or warning; or
- b. Additional information is available to supplement flood watches or warnings; or
- c. Information on elevated stream flow or ponding of water becomes available and warrants public notification.

4.6.5 Content and Format. Flood statements should include the following:

- a. Headline including the type of product in effect (flood watch or warning) or description of the hydrologic conditions;

- b. Area affected;
- c. Notification of the cancellation or expiration of a flood watch or warning;
- d. Call-to-action statement;
- e. Updated impact information;
- f. Additional information including observed and/or forecast data. If tabular data, such as river flood stage, stage data or forecast data in a table format are included, these data will conform with CRS policy by being preceded by a blank line, the double ampersand delimiter “&&” on a separate line, and another blank line.

4.6.6 Valid Time. This product will be valid from the time of release or specified time until canceled, updated, replaced, or until the referenced flood watch or warning expires.

4.7 Hydrologic Statement. Hydrologic forecasts and related information to meet local customers and partners needs.

4.7.1 Product ID. RVS

4.7.2 WMO Header.
FGUSii CCCC YYGGgg BBB
RVSNNN

4.7.3 MND Header.
HYDROLOGIC STATEMENT
NATIONAL WEATHER SERVICE (insert WFO name)
Time AM or PM (local) day month date year

4.7.4 Issuance Criteria. This product will be issued at regional and local discretion.

4.7.5 Content and Format. Hydrologic statements may include:

- d. Headline including the area affected;
- e. Information such as forecasts of river stages, lake levels and ice conditions. These data will conform with CRS policy by being preceded by a blank line, the double ampersand delimiter “&&” on a separate line, and another blank line.

4.7.6 Valid Time. This product will be valid from the time of release until the next update unless otherwise specified.

4.8 Hydrologic Summary. Hydrologic observational data and related information to meet local customers and partners needs.

4.8.1 Product ID. RVA

4.8.2 WMO Header.
SRUSii CCCC YYGGgg BBB
RVANNN

4.8.3 MND Header.
HYDROLOGIC SUMMARY
NATIONAL WEATHER SERVICE (insert WFO name)
Time AM or PM (local) day month date year

4.8.4 Issuance Criteria. This product will be issued at regional and local discretion.

4.8.5 Content and Format. The Hydrologic Summary may include:

- a. Headline including the area affected;
- b. Information such as observations of river stages, lake levels, precipitation data, or ice conditions. These data will conform with CRS policy by being preceded by a blank line, the double ampersand delimiter “&&” on a separate line, and another blank line.

4.8.6 Valid Time. This product will be valid from the time of release until the next update unless otherwise specified.

4.9 Daily River and Lake Summary. The Daily River and Lake Summary is used to provide a standardized report of daily river observations and lake levels, 24 hour changes, and forecast information.

4.9.1 Product ID. RVD

4.9.2 WMO Header.
FGUSii CCCC YYGGgg BBB
RVDNNN

4.9.3 MND Header.
DAILY RIVER AND LAKE SUMMARY
NATIONAL WEATHER SERVICE (insert WFO name)
Time AM or PM (local) day month date year

4.9.4 Issuance Criteria. This product will be issued daily for daily forecast points. More frequent updates may be provided if needed.

4.9.5 Content and Format. The Daily River and Lake Summary will include:

- a. A table containing data in Standard Hydrologic Exchange Format (SHEF) “.b “ format. Headers, defining the content of each column, will be provided in the following order:
 - 1. NWS Location Identifier (grouped and identified by river basin*)
 - 2. Station name
 - 3. Flood stage (if applicable)
 - 4. Current stage or lake elevation,
 - 5. 24 hour change
 - 6. 1 day forecast
 - 7. Additional data, such as 6 hourly or daily forecast information out to 5 days (optional)

All similar tabular data fields should be vertically aligned to maximize readability.

- b. A narrative (optional)

*Note: When data are provided for multiple forecast points on the same river, the river name will be provided only once.

4.9.6 Valid Time. This product will be valid from the time of release until updated.

5. Weather Forecast Office Hydrologic Products Examples. Examples of hydrologic products are contained in NWS Manual 10-922, “Weather Forecast Office Hydrologic Products Examples.”

6. Advanced Hydrologic Prediction Service. Advanced Hydrologic Prediction Service (AHPS) use new science and technology to improve flood warnings and water resource forecasts to meet diverse and changing customer needs. All AHPS products and information provided by a WFO will conform to current NWS, NOAA, and DOC policies.

7. Hydrologic Data Products. Hydrologic data products will:

- a. Contain a WMO header;
- b. Be formatted in the SHEF, unless otherwise noted; and
- c. Have the product name in the dissemination header match the Product ID listed in Tables 1 and 2 below (e.g., HDR 1 is Hydrometeorological Data Report 1).

Product Name	Product ID	WMO Header*	Content
HDR 1	RR1	SRUSii CCCC YYGGgg BBB RR1NNN	Local hydrometeorological data observations
HDR 2	RR2	SRUSii CCCC YYGGgg BBB RR2NNN	Precipitation data
HDR 3	RR3	SRUSii CCCC YYGGgg BBB RR3NNN	Cooperative observer data collected and transmitted using ROSA
HDR 4	RR4	SRUSii CCCC YYGGgg BBB RR4NNN	Cooperative observer special reports
HDR 5	RR5	SRUSii CCCC YYGGgg BBB RR5NNN	Hourly hydrometeorological data (e.g. generated by flood warning systems)
HDR 6	RR6	SRUSii CCCC YYGGgg BBB RR6NNN	ASOS precipitation report produced when precipitation rate exceeds thresholds**
HDR 7	RR7	SRUSii CCCC YYGGgg BBB RR7NNN	ASOS hourly precipitation report**
HDR 8	RR8	SRUSii CCCC YYGGgg BBB RR8NNN	Data provided by water resource agencies
<p>* For information on WMO and Advanced Weather Information Processing System (AWIPS) headers, see http://www.nws.noaa.gov/oso/notices/notices.shtml.</p> <p>** For additional information on ASOS precipitation products, see Federal Meteorological Handbook 2</p> <p>Note: For OCONUS locations, utilize the following in lieu of US in the WMO heading: AK (Alaska); PH (Hawaii); CA (Puerto Rico).</p>			

Table 1. Hydrometeorological data report products.

Product Name	Product ID	WMO Header*	Content
Miscellaneous Hydrologic Data Report	RRM	SRUSii CCCC YYGGgg BBB RRMNNN	Local hydrometeorological data, SHEF or tabular format
Automated Data Report	RRA	SRUSii CCCC YYGGgg BBB RRANNN	Automated river and rain gage data
Daily Data Summary	HYD	SXUSii CCCC YYGGgg BBB HYDNNN	Daily hydrometeorological data summary, SHEF or tabular format
Weekly Data Summary	HYW	CWUSii CCCC YYGGgg BBB HYWNNN	Weekly temperature and precipitation data, SHEF or tabular format
Monthly Data Summary	HYM	CSUSii CCCC YYGGgg BBB HYMNNN	Monthly temperature and precipitation data, SHEF or tabular format
<p>* For information on WMO and Advanced Weather Information Processing System (AWIPS) headers, see http://www.nws.noaa.gov/oso/notices/notices.shtml.</p> <p>Note: For OCONUS locations, utilize the following in lieu of US in the WMO heading: AK (Alaska); PH (Hawaii); CA (Puerto Rico).</p>			

Table 2. Other hydrologic data products.